CLAIMS

We claim:

1. A network architecture for a network of electronic devices comprising:

a device layer including at least one electronic device interconnected to at least one network backbone, wherein each electronic device operates using a device native communication protocol;

a content abstraction program interface in communication with the at least one device of the device layer, the content abstraction program interface abstracting lower level device functions of the at least one electronic device and providing the at least one device with a set of content services which control the content accessible to the at least one electronic device.

2. A network architecture as in Claim 1, wherein the content abstraction program interface further includes client applications which implement the content services.

3. A network architecture as in Claim 2, wherein the client applications of the content abstraction program interface include a content location system for locating content accessible to the at least one electronic device.

4. A network architecture as in Claim 3 wherein the client applications of the content abstraction program interface include a content change notification system which tracks changes in content and content related information and notifies client applications which are registered with the content change notification system of the changes in content and content related information.

5. A network architecture as in Claim 4, wherein the client applications of the content abstraction program interface include a content engagement system which enables the engagement of content regardless of its location on the network.

6. A network architecture as in Claim 5, wherein the content location system and the content engagement application are registered client applications of the content change notification application.

7. A network architecture as in Claim 1, further including a device abstraction layer which is interposed between the device layer and the content abstraction program interface, the device abstraction layer communicating with the at least one device of the device layer using device native communication protocols and communicating with the content abstraction program interface using a unified communication interface.

8. A network architecture comprising:

a device layer including,

at least one electronic device programmed to communicate using a device native communication protocol,

at least one network backbone, each electronic device connected to one of the at least one network backbone;

a device abstraction layer connected to the device layer, the device abstraction layer enabling communication between the at least one device and the device abstraction layer using the device native communication protocol of the at least one electronic device, the device abstraction layer further enabling communication between the device abstraction layer and a higher network layer in a manner independent of device native communication protocols.

9. A network architecture as in Claim 8, wherein the device abstraction layer includes:

a set of proxies, each proxy enabling communication between the at least one device and the device abstraction layer using a device native communication protocol, and

a unified communication interface for communicating between the device abstraction layer and a higher network layer in a manner independent of device native communication protocols.

10. The network architecture of Claim 8, wherein the higher network layer includes a content abstraction program interface which includes a set of content services for controlling

the content accessible to the at least one electronic device, the content abstraction program interface communicates with the device abstraction layer through the unified communication interface of the device abstraction layer.

11. A network architecture for a network of electronic devices comprising:

a device layer having a plurality of electronic devices interconnected using at least one network backbone, wherein the plurality of electronic devices each operate using a device native communication protocol;

content accessible to the plurality of electronic devices;

a content abstraction program interface which includes a set of content services for controlling the content accessible to the plurality of interconnected electronic devices;

a device abstraction layer which can communicate with the plurality of devices regardless of the device native communication protocol used by any of the plurality of devices and which presents a unified communication interface to the content abstraction program interface; and

the content abstraction program interface communicates with the device layer through the unified communication interface of the device abstraction layer such that the content abstraction program interface abstracts low level device control functions of the plurality of devices into the set of content services which control the content accessible to the plurality of interconnected electronic devices.

12. The network architecture of Claim 11 wherein the DAL includes a set of proxies for communicating with the devices of the device layer.

13. The network architecture of Claim 11 wherein low level device control functions which are abstracted by the content abstraction program interface are exposed to permit access to the low level device control functions.

14. The network architecture of Claim 13 wherein the exposed low level device control functions include unique device features.

15. The network architecture of Claim 12 wherein the content abstraction program interface includes a content location system (CLS) for locating content accessible to the plurality of interconnected electronic devices.

16. The network architecture of Claim 15 wherein the CLS includes:

a file manager which receives event information concerning content and content related information,

a content repository having a plurality of content file systems, wherein the file manager creates and maintains the content file systems,

a virtual file system, wherein the file manager forwards information from the content repository to the virtual file system which creates and maintains a table of content which includes updated content and content related information,

a content reader, wherein the content reader reads the content and content related information from the virtual file system into a content identification (CID) table wherein each piece of content and content related information is associated with a unique content identifier and stored as a unique content entry in the CID table,

a content database, wherein the content reader also reads each unique content entry in the CID table into the content database, and

a writer for writing selected unique content entries into cached pages which can be accessed by applications using the architecture.

17. The network architecture of Claim 16 wherein event information, concerning content and content related information, received by the file manager, is provided to the file manager by a content change notification system.

18. The network architecture of Claim 16 wherein the CLS further includes a data enhancer which analyzes each unique content entry the CID table to determine its completeness, and wherein the data enhancer supplements each incomplete unique content entry with supplementary content and content related information.

19. The network architecture of Claim 18 wherein the data enhancer supplements the incomplete unique content entries with supplementary content and content related information retrieved through Internet sources.

20. The network architecture of Claim 16, wherein the CLS further includes a profile database which includes information concerning network user content use patterns and preferences and includes a profile reader which reads the information from the profile database into the writer which writes the profile information into cached pages which can be accessed by applications using the architecture.

21. The network architecture of Claim 20 wherein the profile database is updated with content usage information provided by a content engagement system.

22. The network architecture of Claim 15 wherein the content abstraction program interface further includes a content change notification system (CCNS) which tracks changes in content and content related information and notifies client applications which are registered with the CCNS of the changes in content and content related information.

23. The network architecture of Claim 22 wherein the CCNS includes,

a client register repository for registering client services and client applications and storing such registration information in a registration database,

an event manager for receiving event information and communicating with the client register repository and using the registration information in the registration database to determine which registered client services and client applications are registered to receive the event information,

a content change notification poster, and

wherein the event manager communicates with the content change notification poster instructing the content change notification poster to post the event information to registered client services and client applications which have been determined by the event manager to be registered to receive the event information.

24. The network architecture of Claim 22 wherein the CLS is registered with the CCNS as a client application and wherein the CCNS notifies the CLS of the changes in content and content related information.

25. The network architecture of Claim 24 wherein the content abstraction program interface further includes a content engagement system (CES) which enables the engagement of content regardless of its location on the network and wherein the CES notifies the CCNS of changes in content engagement status.

26. The network architecture of Claim 22 wherein the content abstraction program interface further includes a content engagement system (CES) which engages content accessible to the plurality of interconnected electronic devices in conjunction with location information provided by the CLS.

27. The network architecture of Claim 26 wherein the CES further includes

an activity map;

a control application interface;

an engagement manager having a parser, a scheduler, and an executor;

the engagement manager communicates with the activity map to determine the current engagement status of the content and the plurality of interconnected electronic devices;

the parser receives and interprets instructions to engage content and distributes the instructions for further action;

the scheduler determines the status of preset engagement instructions and provides instructions based on the preset engagement instructions; and

the executor, in response to instructions from the scheduler and parser, communicates the instructions to the device layer where selected source and sink devices are engaged such that the content is streamed from the source device to the sink device.

28. The network architecture of Claim 27 wherein the CES further includes a profile database which is in communication with the engagement manager such that changes in device and content engagement status become part of the profile database, and

wherein the profile database communicates with the CLS to generate content profiles.

29. The network architecture of Claim 27 wherein the engagement instructions received by the engagement manager are communicated by the scheduler in response to preset engagement instructions received by the scheduler.

30. The network architecture of Claim 26 wherein the CES includes, in combination, an engagement manager, an activity map, a profile interface, and a control application interface,

wherein the CES receives instructions to engage content and in response communicates with the device abstraction layer to engage the content, and

wherein the CES communicates with the CCNS to report the change in content engagement status.

31. A network architecture for a network of electronic devices comprising:

a device layer including at least one electronic device interconnected to at least one network backbone;

content on the network;

an abstraction layer in communication with the at least one device of the device layer, the abstraction layer abstracting lower level device functions of the at least one electronic device and providing the at least one device with a set of content services which control the content accessible to the at least one electronic device.

32. The network architecture of Claim 31 wherein the abstraction layer includes a content location system for finding the location of the content on the network.

33. The network architecture of Claim 31 wherein the content location system includes:

a file manager which receives event information concerning content and content related information, the file manager creates and maintains the content file systems,

a content repository having a plurality of content file systems;

a virtual file system, wherein the file manager forwards information from the content repository to the virtual file system which creates and maintains a table of content which includes updated content and content related information,

a content reader, wherein the content reader reads the content and content related information from the virtual file system into a content identification (CID) table wherein each piece of content and content related information is associated with a unique content identifier and stored as a unique content entry in the CID table,

a content database, wherein the content reader also reads each unique content entry in the CID table into the content database, and

a writer for writing selected unique content entries into cached pages which can be accessed by applications using the architecture.

34. The network architecture of Claim 32 wherein the abstraction layer includes a content change notification system which tracks changes in content and content related information and notifies client applications which are registered with the content change notification system of the changes in content and content related information and includes a content engagement system which enables the engagement of content regardless of its location on the network.

35. The network architecture of Claim 31 wherein the abstraction layer includes a content change notification system which tracks changes in content and content related information and notifies client applications which are registered with the content change notification system of the changes in content and content related information.

36. The network architecture of Claim 35 wherein the content change notification system includes,

a client register repository for registering client services and client applications and storing such registration information in a registration database;

an event manager for receiving event information and communicating with the client register repository and using the registration information in the registration database to determine which registered client services and client applications are registered to receive the event information;

a content change notification poster; and

wherein the event manager communicates with the content change notification poster instructing the content change notification poster to post the event information to registered client services and client applications which have been determined by the event manager to be registered to receive the event information.

37. The network architecture of Claim 31 wherein the abstraction layer includes a content engagement system which enables the engagement of content regardless of its location on the network.

38. The network architecture of Claim 37 wherein the content engagement system further includes,

an engagement manager having a parser, a scheduler, and an executor;

an activity map;

a control application interface;

the parser of the engagement manager receives instructions to engage content, the parser interprets the instructions and distributes the instructions for further action,

the engagement manager communicates with the activity map to determine the current engagement status of the content and the plurality of interconnected electronic devices,

the scheduler to determines the status of preset engagement instructions and issues engagement instructions based on the preset engagement instructions; and

the executor of the engagement manager, in response to engagement instructions received from the parser and scheduler, communicates with the control application interface which communicates with the device abstraction layer to engage source and sink devices such that the content is streamed from the source device to the sink device.

39. In a network of electronic devices, method for providing content services and abstracting lower level device functions in a network of at least one electronic device comprising:

(a) presenting a list of applicable content services;

(b) accessing a list of content services;

(c) selecting a content service;

(d) initiating a content service request;

(e) interpreting the content service request;

(f) determining which of the content services and which of the at least one device is appropriate to receive the interpreted request;

(g) communicating the interpreted request to the appropriate at least one device and to the appropriate content service; and

(h) executing the service request.

40. The method of Claim 39, wherein (a) presenting a list of applicable content services includes:

locating content and content related information accessible to the network; and

displaying the content and content related information in a manner which abstracts low level device functions and displays content services.

41. The method of Claim 39 wherein (g) communicating the interpreted request includes communicating the request to the appropriate at least one device in a device native communication protocol associated with the appropriate at least one device.

42. The method of Claim 41 wherein (g) communicating the request to the appropriate at least one device in a device native communication protocol associated with the appropriate at least one device is facilitated through the use of communication proxies.

43. The method of Claim 39 wherein executing the service request (h) includes:

engaging the appropriate at least one device in order to execute the service request; and

presenting a user with appropriate device functions and content services as needed.